Getting Ready

Montana Common Core Standards and Assessments

Announcing the adoption
and transition to
Montana Common Core Standards and Assessments
by the Montana Board of Public Education
on **November 4, 2011.**

opi.mt.gov

The Montana Office of Public Instruction will provide on-going information, training and resources.

Website: http://www.opi.mt.gov/MontanaCommonCoreStandards

MONTANA COMMON CORE STANDARDS & ASSESSMENT 2012 WEBINAR SERIES

Focus and Coherence

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Focus and Coherence: Critical Areas and Progressions

Highlights

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MCCS Mathematics Webinar Series

Getting Every Montana Student College and Career Ready

TOWARD GREATER FOCUS AND COHERENCE

William Schmidt and Richard Houang (2002) have said that content standards and curricula are coherent if they are ***articulated over time as a sequence of topics and performances that are logical*** *and reflect, where appropriate, the sequential or hierarchical nature of the disciplinary content from which the subject matter derives. That is, what and how students are taught should reflect not only the topics that fall within a certain academic discipline, but also* ***the key ideas that determine how knowledge is organized*** *and generated within that discipline.*

These Standards endeavor to follow such a design, not only by stressing conceptual understanding of key ideas, but also by continually returning to organizing principles such as place value or the laws of arithmetic to structure those ideas.

Introduction: Montana Common Core Standards, 2011

TOWARD GREATER FOCUS AND COHERENCE

In addition, the “sequence of topics and performances” that is outlined in a body of mathematics standards must also respect what is known about how students learn. …

In recognition of this, the development of these Standards began with research-based learning progressions detailing what is known today about how students’ mathematical knowledge, skill, and understanding develop over time.

SIX MAJOR SHIFTS IN MATHEMATICS

Shift 1:
Focus

Shift 2:
Coherence

Shift 3:
College and Career Readiness

Shift 4:
Mathematical Practices

Shift 5:
Application

Shift 6:
Balanced Emphasis

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FOCUS, COHERENCE, RIGOR

FOCUS

Kindergarten Overview

Domains	Counting and Cardinality	Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data	Geometry
Clusters	• Know number names and the count sequence • Counting to tell the number of objects • Compare numbers	• Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from	• Work with numbers 11 – 19 to gain foundations for place value	• Describe and compare measurable attributes • Classify objects and count the number of objects in each category	• Identify and describe shapes • Analyze, compare, create and compose shapes
Mathematical Practices	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively.	3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.	5. Use appropriate tools strategically. 6. Attend to precision.	7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	

In Kindergarten, instructional time should focus on two critical areas:

1. ***Representing and comparing whole numbers, initially with sets of objects***
   - Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as 5 + 2 = 7 and 7 – 2 = 5. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.
2. ***Describing shapes and space***
   - Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

More learning time in Kindergarten should be devoted to number than to other topics.

Montana Mathematics Grade 7 Content Standards

In Grade 7, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

1. Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.

2. Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.

3. Students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects. In preparation for work on congruence and similarity in Grade 8 they reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections. They solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms.

4. Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.

Integrated Pathway: Mathematics I

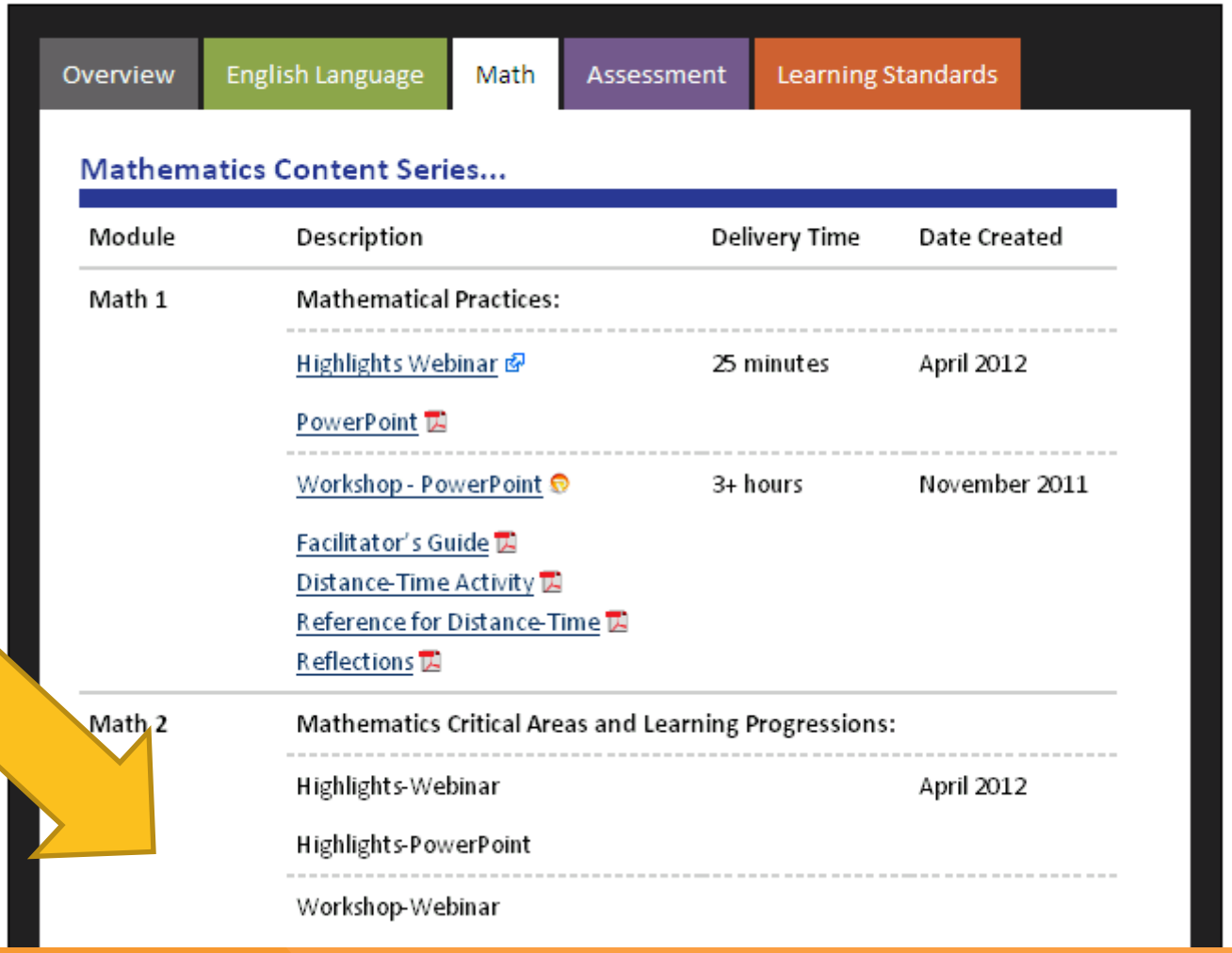
The fundamental purpose of Mathematics I is to formalize and extend the mathematics that students learned in the middle grades. The critical areas, organized into units, deepen and extend understanding of linear relationships, in part by contrasting them with exponential phenomena, and in part by applying linear models to data that exhibit a linear trend. Mathematics 1 uses properties and theorems involving congruent figures to deepen and extend understanding of geometric knowledge from prior grades. The final unit in the course ties together the algebraic and geometric ideas studied. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations.

Critical Area 1: By the end of eighth grade students have had a variety of experiences working with expressions and creating equations. In this first unit, students continue this work by using quantities to model and analyze situations, to interpret expressions, and by creating equations to describe situations.

Critical Area 2: In earlier grades, students define, evaluate, and compare functions, and use them to model relationships between quantities. In this unit, students will learn function notation and develop the concepts of domain and range. They move beyond viewing functions as processes that take inputs and yield outputs and start viewing functions as objects in their own right. They explore many examples of functions, including sequences; they interpret functions given graphically, numerically, symbolically, and verbally, translate between representations, and understand the limitations of various representations. They work with functions given by graphs and tables, keeping in mind that, depending upon the context, these representations are likely to be approximate and incomplete. Their work includes functions that can be described or approximated by formulas as well as those that cannot. When functions describe relationships between quantities arising from a context, students reason with the units in which those quantities are measured. Students build on and informally extend their understanding of integer exponents to consider exponential functions. They compare and contrast linear and exponential functions, distinguishing between additive and multiplicative change. They interpret arithmetic sequences as linear functions and geometric sequences as exponential functions.

Critical Area 3: By the end of eighth grade, students have learned to solve linear equations in one variable and have applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables. This unit builds on these earlier experiences by asking students to analyze and explain the process of solving an equation

IN-DEPTH UNDERSTANDING



Professional Development Materials – Indexed by Topic

NOTE: To find MCCS sequential planning resources, please visit Getting Started.

Overview | English Language | Math | Assessment | Learning Standards

Mathematics Content Series...

Module	Description	Delivery Time	Date Created
Math 1	Mathematical Practices:		
	Highlights Webinar	25 minutes	April 2012
	PowerPoint		
	Workshop - PowerPoint	3+ hours	November 2011
	Facilitator's Guide		
	Distance-Time Activity		
	Reference for Distance-Time		
	Reflections		
Math 2	Mathematics Critical Areas and Learning Progressions:		
	Highlights-Webinar		April 2012
	Highlights-PowerPoint		
	Workshop-Webinar		

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A CLOSER LOOK A FOCUS AND COHERENCE

Education Northwest Orientation Modules

- Exploring the Critical Areas in Grades K-8
- Understanding Cluster Organization
- Exploring the Domains in Grades K-8
- Exploring the Critical Areas in High School
- Matching Clusters of Standards to Critical Areas in one High School Course
- Exploring Standard Progressions Across High School Courses

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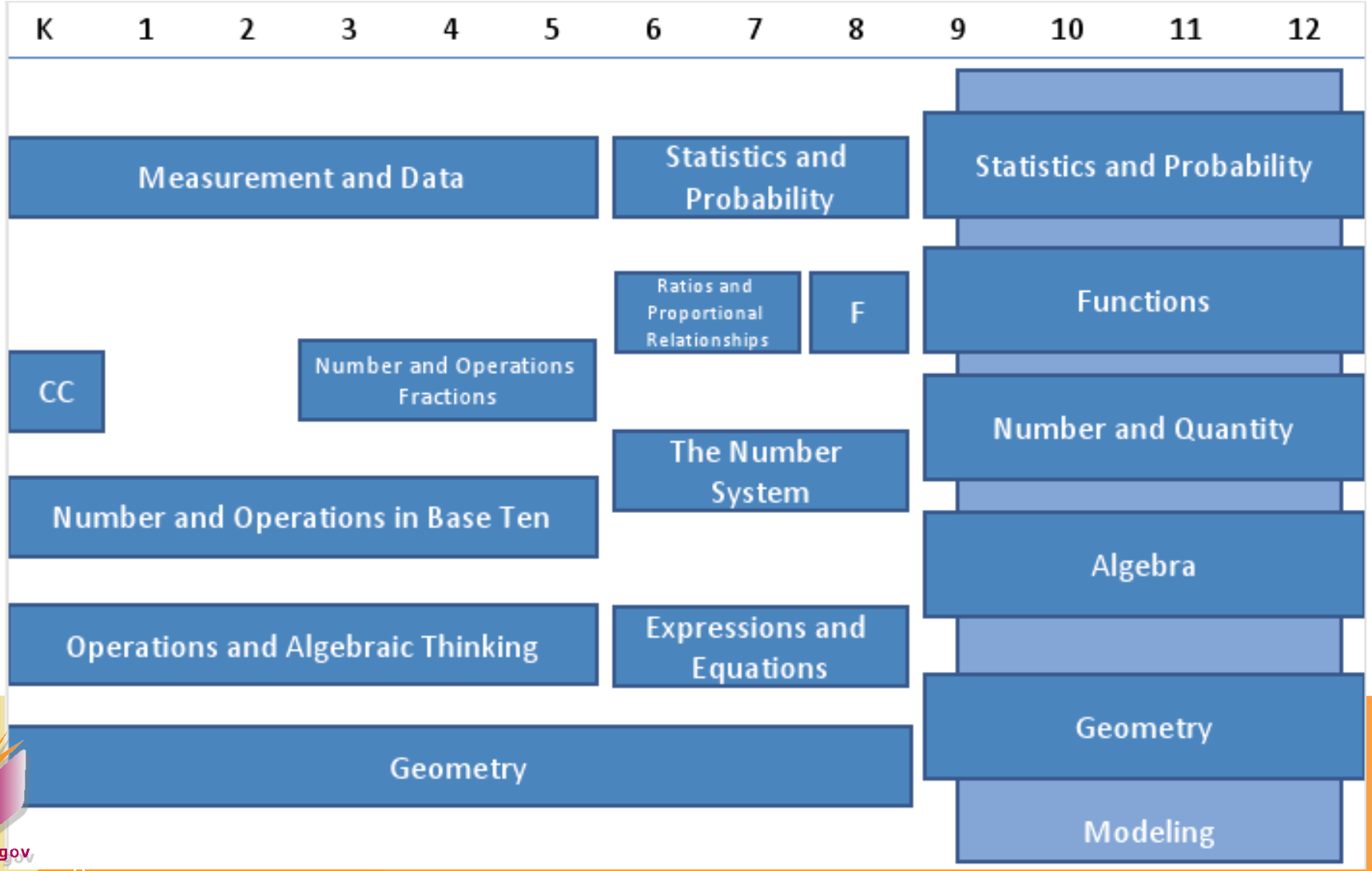
http://educationnorthwest.org/resource/1800

COHERENCE

DOMAIN PROGRESSION



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Tools for the Common Core Standards

News about tools that are being developed to support implementation of the Common Core State Standards

Home About Illustrative Mathematics Tools

Category Archives: *Progressions*

Progressions

Draft high school Statistics and Probability progression

Posted on April 21, 2012 by Bill McCallum

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Recent Posts

- Phil Daro on learning mathematics through problem solving
- Upcoming Webinar

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http://commoncoretools.me/category/progressions/

Illustrative Mathematics

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COMMUNITY
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TERMS OF USE

K-8 Standards

High School Standards

Practice Standards

Illustrative Mathematics provides guidance to states, assessment consortia, testing companies, and curriculum developers by illustrating the range and types of mathematical work that students experience in a faithful implementation of the Common Core State Standards, and by publishing other tools that support implementation of the standards.

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http://illustrativemathematics.org/

Turn-On Common Core Math

Click below to open the Learning Trajectories Hexagon Map of the Common Core Mathematics Standards. Single click to display a single trajectory and its unpacked descriptors or double click on a hexagon go to a single standard.

Learning Trajectories Hexagon Map of the Common Core Mathematics Standards

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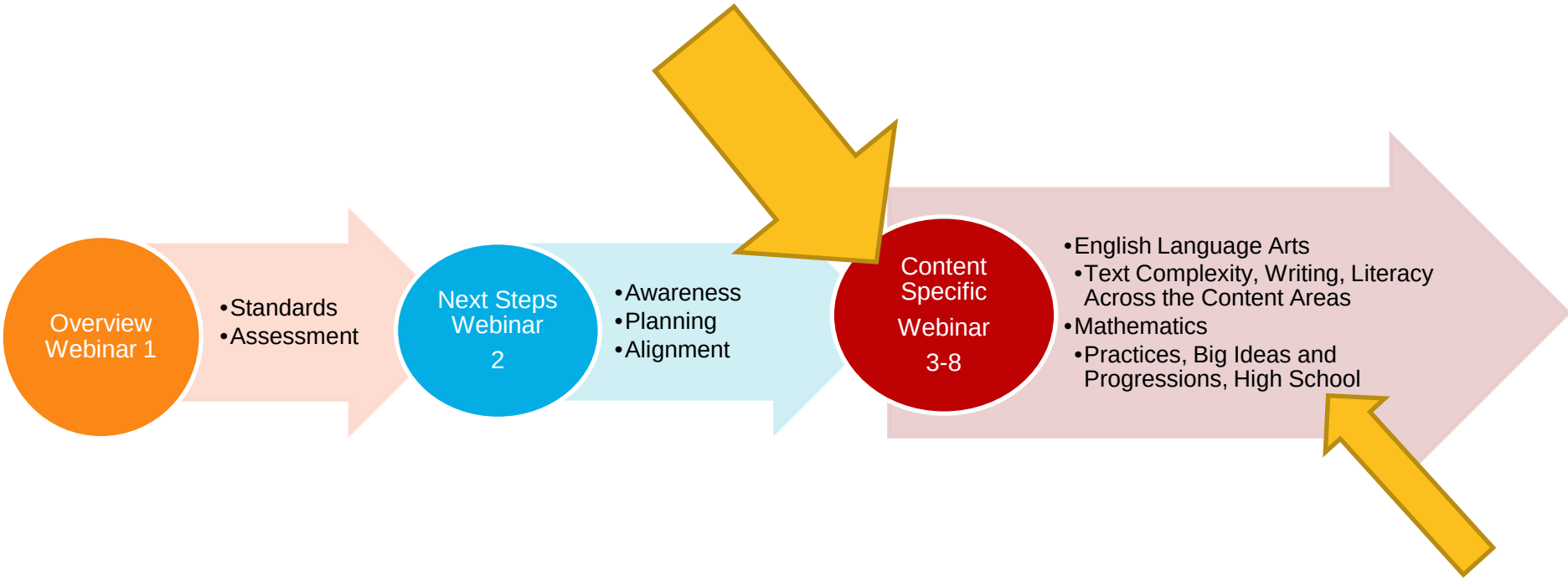

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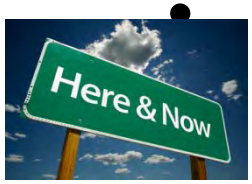

- **Try Something Now**
  - Identify critical areas and learn about progressions in one domain
- **Take A Look At Resources**
  - OPI MCCS Webpage
  - Progression Documents
  - Education NW
  - IllustrativeMathematics.org
  - TurnonCC.org
- **Talk About It**
  - How will you use the critical areas to bring focus to your curriculum and guide your instruction and assessments?

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